

**BEST AVAILABLE COPY**

Serial No. 10/666,825

Docket No. NG(ST)7616

**AMENDMENTS TO THE DRAWINGS**

Please replace the drawing page of the Present Application, which includes FIGS. 1A-1C, FIGS. 2A-2C, and FIGS. 3A and 3B, with the attached replacement drawing sheet. The replacement drawing sheet includes a "Prior Art" descriptor for FIGS. 1A-1C, per the suggestion of the Examiner in the Office Action dated November 15, 2006. Withdrawal of the objection to the drawings is thus respectfully requested.

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REMARKS

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Claims 1-5 are currently pending in the subject application, and are presently under consideration. Claims 1-5 are rejected. Favorable reconsideration of the application is requested in view of the amendments and comments herein.

I. Rejection of Claims 1-5 Under 35 U.S.C. §112, Second Paragraph

Claims 1-5 are rejected under 35 U.S.C. §112, Second Paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. Claim 1 has been amended to replace "zero-level sensing threshold" with "zero-amplitude sensing threshold," such that claim 1 is consistent with the language set forth in paragraph [0019] of the Specification. In addition, claim 2 has been amended pursuant to the Examiner's suggestion in the Office Action dated November 15, 2006. Therefore, claims 1 and 2, as well as claims 3-5 which depend therefrom, now satisfy 35 U.S.C. §112, Second Paragraph, and should thus be in condition for examination. Withdrawal of the rejection of claims 1-5 under 35 U.S.C. §112, Second Paragraph, is respectfully requested.

II. Rejection of Claim 1 Under 35 U.S.C. §102(e)

Claim 1 stands rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,947,492 to Santhoff, et al. ("Santhoff"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claim 1 recites encoding binary data of one value type as positive UWB pulses and binary data of the other value type as negative UWB pulses, the value types being logical "0" and "1" value types, and detecting the presence of positive and negative UWB pulses using a zero-amplitude sensing threshold. In the Office Action dated November 15, 2006 (hereinafter "Office Action"), the Examiner asserts that Santhoff teaches claim 1 by stating that "Santhoff is teaching frame having positive and negative data windows and the encoding of the transmission is being achieved by positioning the positive pulse within the positive data window and negative pulse

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within the negative data window," (Office Action, pages 3-4; citing Santhoff, FIG. 3; col. 6, ll. 59-67; col. 7, ll. 1-2). Representative for Applicant respectfully disagrees.

Santhoff teaches that a UWB pulse train includes bipolar pulse pairs defining a frame having a bipolar pair of timing windows (Santhoff, col. 6, ll. 10-13). The positive pulse is positioned in the positive timing window and the negative pulse is positioned in the negative timing window, and is otherwise identical to the positive timing window (Santhoff, col. 6, ll. 16-18 and 48-50). Data is included in the pulse pairs based on a pulse position in the positive timing window and in the corresponding negative timing window, such that the negative timing window provides a direct verification of the pulse position in the preceding positive timing window (Santhoff, col. 7, ll. 62-66; col. 8, ll. 9-13). Specifically, for both the positive timing window and the complementary negative timing window, if the pulse resides in the first time slot of a timing window, the data pulse represents a binary value of 00; if the pulse resides in the second time slot of a timing window, the data pulse represents a binary value of 01; if the pulse resides in the third timing slot, the data pulse represents a binary value of 10; and, if the pulse resides in the fourth timing slot, the data pulse represents a binary value of 11 (Santhoff, col. 7, line 66 through col. 8, line 8).

According to the teachings of Santhoff, data is encoded based on a pulse position within a positive timing window and a complementary negative timing window, such that the positive timing window and the negative timing window are always encoded the same. Thus, a given positive pulse is not determinative of the value of encoded data relative to a negative pulse in the UWB signal of Santhoff because the positive pulse and the negative pulse of Santhoff are complementary and equal. Therefore, Santhoff does not teach encoding binary data of one value type as positive UWB pulses and binary data of the other value type as negative UWB pulses, as recited in claim 1. Accordingly, Santhoff does not anticipate claim 1. Withdrawal of the rejection of claim 1, as well as claims 2-5 which depend therefrom, is respectfully requested.

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**III. Rejection of Claim 2 Under 35 U.S.C. §103(a)**

Claim 2 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Santhoff in view of U.S. Patent No. 6,512,474 to Pergande ("Pergande"). Claim 2 depends from claim 1. As described above, Santhoff fails to teach encoding binary data of one value type as positive UWB pulses and binary data of the other value type as negative UWB pulses, as recited in claim 1, from which claim 2 depends. The addition of Pergande does not cure the deficiencies of Santhoff to teach or suggest claim 1. Thus, claim 2 should also be allowed over the cited art.

In addition, claim 2 recites that each of the UWB pulses includes a carrier signal, and each of the negative UWB pulses has its carrier phase inverted. The Office Action states that Santhoff fails to teach that a UWB pulse includes a carrier signal, and asserts that Pergande teaches the elements of claim 2 (Office Action, pages 4-5; citing Pergande, FIG. 2; Abstract; col. 1, ll. 56-57; and col. 3, ll. 53-64). Representative for Applicant respectfully disagrees.

Pergande teaches the generation of a UWB signal that includes a carrier frequency that reverses in phase each cycle (Pergande, Abstract). Specifically, the carrier signal is a sine wave at a microwave frequency that inverts phase every cycle (Pergande, col. 1, ll. 56-57; col. 3, ll. 53-64). Thus, Pergande teaches that the sine wave carrier of the UWB reverses phase at every period of the sine wave, regardless of the data encoded therein. Therefore, Pergande provides no teaching that the phase of the UWB signal is related to the bit value that is encoded therein. Accordingly, neither Santhoff nor Pergande, individually or in combination, teach or suggest that each of the negative UWB pulses has its carrier phase inverted, as recited in claim 2.

Withdrawal of the rejection of claim 2, as well as claims 3-5 which depend therefrom, is respectfully requested.

**IV. Rejection of Claim 3 Under 35 U.S.C. §103(a)**

Claim 3 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Santhoff in view of Pergande, and further in view of U.S. Patent No. 5,949,826 to Iiyama, et al. ("Iiyama"). Claim 3 depends from claim 2, which depends from claim 1. As described above, Santhoff does

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not anticipate claim 1, and the combination of Santhoff and Pergande does not teach or suggest claim 2. Thus, claim 3 should also be allowed over the cited art.

In addition, claim 3 recites sensing whether the carrier phase is inverted or not, rectifying and filtering the UWB carrier signal pulse to provide a unidirectional signal, and adjusting the polarity of the unidirectional signal based on whether the sensed carrier phase is inverted or not. The Examiner asserts that Santhoff teaches adjusting a polarity of a unidirectional signal based on "detecting the positions of the positive and negative pulses in the positive and negative data windows and the correction of error with respect to the positive and negative pulses," (Office Action, page 5; citing Santhoff; col. 7, ll. 49-53; col. 8, ll. 9-29; col. 9, ll. 1-23). Representative for Applicant respectfully disagrees. As described above, Santhoff teaches that a UWB pulse train includes bipolar pulse pairs defining a frame having a bipolar pair of timing windows that includes data based on a pulse position in the positive timing window and in the corresponding negative timing window (Santhoff; col. 6, ll. 10-13; col. 7, ll. 62-66; col. 8, ll. 9-13). Thus, Santhoff merely teaches that a UWB signal having a positive time window and a complementary but equal negative time window is received, with data being included based on a pulse position. However, Santhoff provides no teaching as to an adjustment of polarity of a unidirectional signal.

In addition, Representative for Applicant respectfully submits that the rejection of claim 3 is deficient because the Office Action appears to disregard a portion of the language of claim 3. Specifically, claim 3 recites adjusting the polarity of the unidirectional signal *based on whether the sensed carrier phase is inverted or not* (emphasis added). The italicized portion appears to have been omitted from the discussion set forth in the Office Action regarding the rejection of claim 3. Representative for Applicant respectfully submits that neither Santhoff nor any other cited reference teaches or suggests adjusting the polarity of the unidirectional signal based on whether the sensed carrier phase is inverted or not, as recited in claim 3.

The Examiner also asserts that Pergande teaches sensing whether the carrier phase is inverted or not by stating that "Pergande teaches that in order to generate an ultra wideband signal different tones with respect to frequencies are combined by the amplifiers which use the

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phase inverted signal, and in order to produce the desired signal with excellent fidelity, amplifier needs to sense if the carrier signal phase is inverted or not in order to check if additional tone needs to be combined in order to improve the fidelity of the wideband signal," (Office Action, page 5; citing Pergande, FIG. 2; col. 53-64; col. 4, ll. 28-49). Representative for Applicant respectfully disagrees.

Pergande teaches a system that generates a UWB signal, with the sine wave carrier of the UWB signal reversing phase at every period of the sine wave, regardless of the data encoded therein (see, e.g., Pergande, col. 1, ll. 56-57; col. 3, ll. 53-64). Thus, the system of Pergande does not sense whether or not the signal is inverted, but instead generates the signal such that every other cycle is inverted. Furthermore, Representative for Applicant respectfully submits that the Examiner's statement that the "amplifier needs to sense if the carrier signal phase is inverted or not in order to check if additional tone needs to be combined in order to improve the fidelity of the wideband signal" is a mischaracterization of the teachings of Pergande.

Specifically, Pergande teaches that additional tones can be added at different fractional frequencies to improve the fidelity of the UWB signal (Pergande, col. 4, ll. 38-49). However, Pergande provides no teaching, explicitly or implicitly, that the addition of tones is based on sensing an inverted phase. Therefore, neither Pergande nor any other cited reference teaches or suggests sensing whether the carrier phase is inverted or not, as recited in claim 3.

The Examiner also asserts that Pergande teaches filtering a UWB carrier signal pulse to provide a unidirectional signal by stating that "Pergande discloses filtering of UWB carrier signal pulse in order to generate a UWB signal," (Office Action, page 6; citing Pergande, col. 2, ll. 24-29 and 38-42). Representative for Applicant respectfully disagrees, and respectfully submits that providing a unidirectional signal is unrelated to the generation of a UWB signal. In other words, the Examiner has not provided any basis for how the teaching of Pergande of generating a UWB signal relates to filtering a UWB carrier signal pulse to provide a unidirectional signal, as recited in claim 3, or even how a unidirectional signal can be generated from filtering a UWB carrier signal pulse. Pergande is silent as to generating a unidirectional signal because Pergande fails to teach that a UWB signal pulse is rectified. Therefore, neither Pergande nor any other cited art

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teaches or suggests rectifying and filtering the UWB carrier signal pulse to provide a unidirectional signal, as recited in claim 3.

The Examiner further states that Pergande does not teach rectification of a UWB carrier signal, and asserts that such element is taught by Iiyama by stating that "Iiyama teaches a rectification circuit to detect the envelope of the effective carrier corresponding components from the signal," (Office Action, page 6; citing Iiyama, FIG. 17; col. 2, ll. 1-7). Representative for Applicant respectfully disagrees, and respectfully submits that the teachings of Iiyama are not directed to UWB signals. Iiyama teaches a data transmission and reception system for phase shift keying (PSK) signals (Iiyama, Abstract). The portion of Iiyama cited by the Examiner pertains to an example of a rectifier that rectifies an amplitude shift keying (ASK) signal for detecting an envelope of the ASK signal. Thus, the teachings of Iiyama are unrelated to UWB signals. In addition, because the teachings of Iiyama are not directed to UWB signals, Representative for Applicant respectfully submits that there is no motivation for one of ordinary skill in the art to combine the teachings of Iiyama with any of the other cited art to achieve the method of claim 3. Therefore, neither Iiyama nor any other cited art teaches or suggests rectifying a UWB carrier signal to provide a unidirectional signal, as recited in claim 3.

For the reasons described above, Santhoff, Pergande, and Iiyama, individually or in combination, do not teach or suggest claim 3. Accordingly, withdrawal of the rejection of claim 3, as well as claims 4 and 5 which depend therefrom, is respectfully requested.

**V. Rejection of Claims 4-5 Under 35 U.S.C. §103(a)**

Claims 4-5 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Santhoff in view of Pergande and Iiyama, and further in view of U.S. Patent No. 7,082,153 to Balachandran, et al. ("Balachandran"). Claims 4 and 5 depend from claim 3, which depend from claims 1 and 2. As described above, Santhoff does not anticipate claim 1, the combination of Santhoff and Pergande does not teach or suggest claim 2, and the combination of Santhoff, Pergande, and Iiyama does not teach or suggest claim 3. Thus, claims 4 and 5 should also be allowed over the cited art.

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In addition, claim 4 recites assigning portions of each time slot to respective communication channels, whereby data signals pertaining to multiple communication channels are transmitted in a single time slot. The Examiner relies on Balachandran in the rejection of claim 4, stating that "Balachandran teaches assigning portions of each time slot to respective communication channels, whereby data signals pertaining to multiple communication channels are transmitted in a single time slot," (Office Action, page 7; citing Balachandran, Abstract; col. 2, ll. 33-47). Representative for Applicant respectfully disagrees. Balachandran teaches a pulse width modulation scheme for coding a UWB signal (Balachandran, Abstract). The modulated UWB communications signal is transmitted across a communications channel, and a plurality of data bits are received, each data bit having a first value corresponding to the binary value "0" or a second value corresponding to the binary value "1," (Balachandran, col. 2, ll. 33-47). Each time slot in a time-hopped sequence includes data for each of a plurality of integer time sequence elements (Balachandran, col. 2, ll. 49-57). However, Balachandran provides no indication that each portion of the time slot is assigned to a respective communication channel, such that a given one time slot includes data signals pertaining to multiple communication channels, as recited in claim 4. Thus, neither Balachandran nor any other cited art teaches or suggests claim 4. Withdrawal of the rejection of claim 4, as well as claim 5 which depends therefrom, is respectfully requested.

Claim 5 recites data signals pertaining to first and second communication channels are encoded in the first and second halves, respectively, of each UWB pulse time slot. The Examiner asserts that Balachandran teaches this element of claim 5 (Office Action, page 7; citing Balachandran, FIG. 6; col. 8, ll. 34-62). Representative for Applicant respectfully disagrees, and further respectfully submits that the cited sections of Balachandran are unrelated to the data content of first and second halves of a UWB pulse time slot. As described above, Balachandran does not teach or suggest assigning a respective communication channel to a portion of a time slot. Therefore, neither Balachandran nor any other cited art teaches or suggests data signals pertaining to first and second communication channels are encoded in the first and second halves, respectively, of each UWB pulse time slot, as recited in claim 5.



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For the reasons described above, Santhoff, Pergande, Iiyama, and Balachandran, individually or in combination, do not teach or suggest claims 4 and 5. Accordingly, withdrawal of the rejection of claims 4 and 5 is respectfully requested.

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**CONCLUSION**

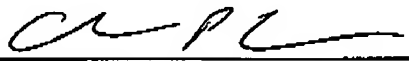
In view of the foregoing remarks, Applicant respectfully submits that the present application is in condition for allowance. Applicant respectfully requests reconsideration of this application and that the application be passed to issue.

Please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Respectfully submitted,

Date

2-15-07

  
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